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# UNITED STATES TRANSPORTATION COMMAND

## RESEARCH, DEVELOPMENT, TEST, & EVALUATION (RDT&E)

# CONTENT

# COMMANDER USTRANSCOM

USTRANSCOM's RDT&E Program provides transformational changes in force projection and sustainment concepts and capabilities across the full spectrum of operations. With our Joint Deployment and Distribution Enterprise (JDDE) partners and the Science & Technology community, the Command explores and invests in promising technologies to address the challenges impacting the effectiveness and efficiency by which we project, sustain, and reconstitute forces.

A proven Distribution Process Owner (DPO) enabler, USTRANSCOM's relatively small investment of RDT&E funds continues to allow for the rapid development and delivery of enhancements that improve Warfighter support and reduce logistics and supply chain operations costs for the Department of Defense (DoD). Promoting the use of autonomous technologies, the Command's program advocates for those capabilities that will ensure America's competitive transportation and logistics advantage.

Visit our RDT&E web site portal at http://www.ustranscom.mil/cmd/associated/rdte/.

# USTRANSCOM OVERVIEW

At every moment of every day, around the globe, USTRANSCOM's superb force of Soldiers, Sailors, Airmen, Marines, Coast Guardsmen, DoD civilians, and commercial providers accomplish a wide array of joint mobility missions. With its people, trucks, trains, aircraft, ships, information systems and infrastructure, USTRANSCOM provides the United States the most responsive strategic mobility capability the world has ever seen.

As the DPO, USTRANSCOM coordinates and oversees the execution of the strategic distribution system. The Command synchronizes the supply chain and related Information Technology (IT) systems as well as contracting authority for procurement of commercial transportation services. It also provides unmatched joint operational command and control enablers to joint force commanders conducting emergent full spectrum operations.

# ABOUT THIS HANDBOOK

This handbook provides an overview of the USTRANSCOM RDT&E program. In support of the USTRANSCOM Strategy, this program leverages emerging technologies to provide efficient global mobility and related capabilities to support the rapid projection of national power and influence.

The handbook is USTRANSCOM's RDT&E strategy, highlighting program goals, current technology challenges and areas of interest, samples of capabilities delivered to the warfighter, and currently funded initiatives aligned with Command strategic goals. In addition, the handbook briefly describes USTRANSCOM's related T2 and Office of Research and Technology Application activities.

# PROGRAM STRATEGIC GOALS

The RDT&E program is a key element in the DoD's ability to improve supply chain management by enhancing joint logistics warfighting capabilities.

## Goals:

- Develop and deploy joint, relevant technologies to improve Warfighter support while reducing costs
- Improve the precision, reliability, visibility and efficiency of the DoD supply chain
- Assure superior strategic, operational and tactical mobility support for the Warfighter

# TECHNOLOGY CHALLENGES/AREAS OF INTEREST

**To provide guidance to the S&T community, USTRANSCOM has established several technology areas of interest. These areas of interest identify specific technological capabilities that will enhance USTRANSCOM's Unified Command Plan missions, IT strategies and roadmaps, fill JDDE capability gaps, and support realization of the USTRANSCOM Commander's Priorities. The Command requires greater flexibility in adjusting the flow of integrated joint capabilities that support the dynamic plans of the Combatant Commands (CCMD). This includes responsive deployment and distribution planning and execution systems that accommodate capabilities-based force packaging and flexible deployment options. To receive USTRANSCOM funding consideration, initiatives must address a non-Title 10 responsibility, be consistent with available funding, and be executed in accordance with DoD Policies and Regulations.**

**Additional capability gap information can be viewed at http://www.transcom.mil/cmd/associated/rdte/ then click on References.**

# Global Access – Challenge

**Standardized Intermodal Containers and Pallets** - Systems that can be used by automated aircraft/ship loading/unloading systems, to include those designed to automatically scan standardized containers and pallets as they are on-loaded/off-loaded. Initiatives must be designed to increase cargo throughput by eliminating the requirement to handle cargo multiple times during shipping, reduce the requirement for multiple Materials Handling Equipment (MHE) systems, reduce need for additional ground personnel throughout the en route system, minimize the requirement to reposition MHE to support deployment/distribution, address pallet construction (current capabilities do not tie to shipments pallet break down, holding, frustration clearance, and costs), and improve the flexibility to be rapidly embarked on multiple expeditionary platforms.

**Rapid Distribution Technologies** - Concepts and technologies that improve the end-to-end flow of military unit equipment and cargo through ocean ports, aerial ports and intermodal inter-change points, to include autonomous capabilities and motion compensation interface platforms, for use with commercial cargo vessels to enhance cargo throughput of military unit equipment at sea.

**Delivery Technologies** - Seeking innovative solutions, to include autonomous technologies, that provide for the safe, accurate and timely delivery of joint forces and their sustainment within an Anti-Access/Area Denial (A2/AD) environment across a complex, distributed battlefield. This includes the re-supply of forces in austere conditions and in high threat areas are just two of the missions driving the need for more accurate and single-pass precision airdrop. This area applies to technologies to ensure survivability of aircraft and personnel on the ground while delivering cargo to a precise location within a high threat environment.

**Opportune Landing Site Identification** - All-weather airfield independence technology focusing on mobility aircraft determining the security of a landing site for arrival and throughput operations without use of a pre-coordinated survey or on-site, ground party analysis.

**Autonomous Aircraft Approach and Landing Guidance** - All-weather and lights-out taxi, take-off and landing capability for mobility aircraft operations from prepared and unprepared fields. Operations may require taxi, takeoff, and landing for aircraft under inclement weather conditions without assistance from navigation guidance systems that are commonly available at most U.S. airports.

# Global Access (con't)

**Force Protection** - Terrorism and asymmetric warfare pose an ever-present threat to our Nation's strategic mobility assets and their embarked cargo, equipment and personnel. This broad area of interest supports proposals to counter these types of threats. Of particular interest is the application of technology to create virtual borders at the point of loading, decontamination of transportation assets, and enhance seaborne and air cargo container standards. Screen cargo for smuggled goods as well as explosive, chemical, and biological threats. Technology interests are in those systems with stand-off, hand-held, robotic and/or unmanned vehicle inspection/detection capabilities (both on land and in the water) as well as fixed detectors to allow for the identification of potential threats before endangering personnel and/or resources. Interests include technologies that, when applied, detect access attempts and can be monitored for intrusion.

**Aircraft Survivability** - USTRANSCOM seeks advanced capabilities to increase aircraft survivability and enhance aircrew situational awareness (SA). Affordable, open system technologies are needed to detect and counter the full range of surface-to-air and air-to-air threats, navigate in contested environments, fuse onboard and off-board data for aircrew SA, and counter directed energy threats to aircrew and sensors.

**Sea Basing Technologies** - Technologies and enablers to enhance the Joint Force Commander's flexibility to deploy and employ from/through a joint sea base as well as deliver and sustain warfighting capabilities at the point of effect. Enhancements should minimize the need to build up a logistics stockpile ashore and permit the forward positioning of joint forces for immediate employment. This includes autonomous technologies that facilitate the trans-loading and/or transporting of supplies and equipment in a sea base operation within a degraded or austere access environment.

**Convoy Security** - The Theater Commander needs a variety of available lift asset options at his disposal to optimize distribution and best mitigate risks depending on Mission, Enemy, Terrain and Weather, Troops and Support Available, Time Available and Civil Considerations. There is limited ability to provide support for multiple, small, widely-dispersed detachments.

**Rapid Construction for Points of Debarkation** - The JDDE lacks the ability to rapidly assess, establish, and secure ports of debarkation in an A2/AD environment to make the Joint force more expeditionary.

# Global Access (con't)

**Mobility Aircraft** - This challenge addresses anti-access concerns, ergonomically designed crew stations to reduce aircrew workload, assured global line of sight/beyond line of sight secure airborne voice and data communications to enable dynamic mission re-tasking while enhancing aircrew situational awareness, and modular concepts that allow for multiple configurations/missions with same/like airframe. Additionally, aging airlift and aerial refueling fleet present a need for technologies that increase the reliability of aircraft systems and structures to include electronic control systems and more reliable avionics packages that will increase aircraft availability and airlift capacity.


**Advanced Mobility Aircraft** - Next generation mobility and air refueling aircraft to provide intra-theater maneuvers. This includes leveraging technologies used for hybrid and unmanned aircraft as well as next generation information, surveillance, and reconnaissance platforms. Advanced mobility aircraft capabilities will include future platforms that have more efficient airframes and engines, improved Command and Control (C2) and defensive systems capabilities, human integration and training, and have greater range, speed, payload, offload and access.

**Fuel Efficiency** - Mobility assets are the largest consumers of fuel within DoD. Seeking technologies that reduce the dependence and/or consumption of fossil fuels while maintaining or improving speed, flexibility, range, and responsiveness in contested environments.

# C2/Cyber/Decision Support - Challenge

**Human System Interface (HSI)** - Poor HSI is a major contributor to data integrity problems in business systems supporting the Defense Transportation System. There is a need for intuitive HSI that reduces cognitive workload and lowers data entry errors for planners/port operators. Edit checks and suggested data correction alerts connected to DoD data dictionaries are needed to improve HSI input.

**Adaptive Planning and Execution** - The community requires trained personnel, well defined processes and the essential technology to ensure DoD's ability to rapidly develop, assess, adapt and execute plans in a dynamic environment.

**Distribution Planning and Forecasting** - There is a lack of collaborative distribution planning, based on an understanding of aggregate customer requirements, for optimizing the JDDE. Require synchronized planning, forecasting and collaboration capabilities to ensure people, processes and assets are in place to execute planned operations.

**Supply Chain Sustainment Simulation Tools** - Joint simulation tools are poorly equipped to integrate sustainment flow modeling at the strategic and operational levels (wholesale and Service-level retail). Little capability exists to do unconstrained "what-if" supply scenarios without manual effort.

**Modeling** - Budget uncertainty and the evolving global mobility environment drive the need to modify our business processes, equipment and infrastructure. Currently USTRANSCOM is limited in its ability to weigh alternative courses of action and/or measure the effectiveness of the proposed changes. USTRANSCOM requires modeling & decision support tools to transform systems, programs and initiatives to ensure operational efficiency.

**Joint Retail Inventory Interoperability** - DoD cannot optimize customer requirements as it does not provide inventory interoperability across all Services and theaters. Information and material exchange across the DoD is inhibited by disparity of systems and insufficient interfaces. Inventory status and shipment information cannot be affected due to lack of connectivity between the various components in supply chain.

**Cross-Domain Information Exchange/Collaboration** - The Command requires a secure means to transition information across multiple classification domains to enable process improvements and reduce system requirements. This includes interaction/interoperability with military/civilian partners which has grown in importance and immediacy with the shift in focus toward home basing and homeland defense posturing. Closer interoperability between non-traditional actors is key to preparing and responding to threats in a truly global manner.

**Manipulation of Large Data Sets** - This area involves the ability for USTRANSCOM to manage "Big Data." The Command requires the capability to explore, analyze and identify trends and correlations between elements of large data sets. This includes the ability to couple separate databases to create a set of data elements. Such manipulation includes a set of tools to assist analysts with identifying, visualizing and portraying data.

# C2/Cyber/Decision Support (con't)

**Information Visualization** - The Warfighter requires a graphical view of logistics and transportation land, sea, air, and waterway operational information with drill-down capability into specific details. Users require a visual representation of information concerning inventory, movement, logistics and transportation information as well as easier and quicker understanding of rapidly changing information based on conveyance maintenance status, weather, intelligence, political/military considerations, etc.

**Distributed Global Mobility C2** - C2 is the heart of successful military endeavors. For global mobility, C2 must be seamless regardless of theater of operation and/or customer being supported. This includes technologies that allow distributed C2 with mobile platforms (whether on land, sea or in the air) as well as technologies that provide the capability to replicate large databases, in a synchronized fashion, across a globally distributed network. In addition, these enclaves must be capable of working "off-line," then seamlessly rejoining the global network following combat or contingency degradation. Additionally, a capability that can plan, allocate and integrate logistics resources effectively and quickly on a global scale in support of the operational needs of the combatant commanders.

**Transportation Node Optimization** - Warfighters need a single integrated view of force movement and sustainment planning requirements to provide a continuous and optimal balancing of total demand and capacity from plan inception to mission completion.

**Information Science and Technology** - This area involves the maturing of technologies that support state-of-the-art capabilities for the Warfighter in the analysis, assimilation, and dissemination of real and simulated digitized battlespace information. Interests include, but are not limited to: intelligent software agents, course of action analysis, transportation planning and feasibility, embedded training, optimization and resource allocation solutions, collaborative technologies for distributed work environments, and data visualization.

**Knowledge Management Layer** - The operational and technical requirements of an effective near real-time global transportation network cannot be achieved through the application of legacy data-centric software design and development principles. Such a network calls for a degree of interoperability and a level of collaborative decision-support that are not available in any existing industry or government software environment of comparable scale. USTRANSCOM is looking to create an information-centric knowledge management layer on top of a data-centric Corporate Data Environment meta database layer.

# C2/Cyber/Decision Support (con't)

**Process Management and Business Rules** - Joint process descriptions and business rules either do not exist or are unclear for many key deployment and distribution processes. A lack of well-defined, integrated process descriptions causes shipment delays, wastes resources, and undermines efforts to streamline the supply chain. The lack of business rules creates organizational and communication breakdown and precipitates a lack of control. Additionally individuals spend large amounts of time combing through mountains of data, often stored in silo enclaves, to assemble pertinent information for decision-makers.

**Predictive Forecasting** - The warfighter needs ability to more accurately forecast future logistics requirements. The JDDE lacks the capability to predict maintenance and logistics requirements to enhance operational needs and optimize the supply chain, both forward and reverse flow. Where predictive maintenance/logistics forecasting capabilities exist, they are not linked (machine-to-machine) to distribution and logistics support responses.

**Risk Assessment** - There is a lack of available real-time risk assessment information for commanders and deploying units to rapidly determine acceptable levels of risk while en route to final destinations or to an intermediate staging locations.

# C2/Cyber/Decision Support (con't)

**End-to-End (E2E) Asset Visibility** - Stakeholders throughout the deployment and distribution process require the ability to determine shipment status through system access at the beginning of a movement through the various nodes to the final destination/point of need. Stakeholders need the ability to view the status/availability of all assets in-progress, in-storage, in-transit, or in-theater as well as detect pipeline bottlenecks and threats. This information will enable the Warfighter to develop recommended alternatives to overcome bottlenecks and identify threats where shipment security was compromised. Challenges remain in the effectiveness and efficiency of data capture, the ability to maintain visibility of these assets as they traverse the chain and in the ability to create an enterprise view of the data.

**Container Management** - The JDDE has a requirement to control and track containers and minimize detention fees globally. Current processes, systems, tools and/or performance metrics are not sufficient.

**Automatic Identification Technology (AIT)** - AIT and automated information systems (AIS) are two of the basic building blocks in DoD's effort to provide timely asset visibility in the logistics pipeline, whether in-storage, in-transit, in-process or in-theater. Specifically, AIT is used by a business AIS to capture the identity of materiel or packaging at each layer of consolidation to improve logistics processes. AIT also contributes to the track-and-trace capability within the Department's supply and distribution operations. USTRANSCOM is interested in partnering with other organizations in AIT solutions that improve logistics processes in a resource-constraint budget environment.

*Sample in-transit visibility track across the United States*

# C2/Cyber/Decision Support (con't)

**Survivable Communications** - The JDDE needs technical solutions that address survivable and secure communications and networks, information infrastructure protection, and survivable systems engineering. The objectives of the research are to provide secure, survivable, and assured communications over both wired and wireless networks to include highly mobile networks.

**Data** - Explore ideas and prototype tools for advanced data management concepts, including schema integration and data warehousing, in a standardized data environment. Allow transparent access to multiple heterogeneous databases, data mining, and knowledge discovery in large distributed databases. Organize unstructured/multi-structured data and documents into easily searchable queries to enhance data analysis.

**Electronic Data Interchange** - Today USTRANSCOM and its components use electronic data interchange (EDI) to communicate with its industry partners. EDI continues to evolve/mature to meet requirements. The move towards a service-oriented architecture provides additional opportunities for EDI that did not exist previously. There is a need to assess the current state of how EDI is being used and then evaluate where there may be opportunities for future enhancement.

**Cyber Security** - USTRANSCOM and its components must be able to defend its information, detect and mitigate cyber threats against mobility platforms, networks, and C2 systems to continue uninterrupted operations. This requires a platform independent capability to secure deployment/distribution information resident in or traversing low assurance info networks/environments. This includes predictive analysis techniques/tools to dynamically assess future threats, attack vectors, and attacker intent and anticipate actions before they happen (i.e., the capability to defeat an attack before it happens, instead of having to react to it as it occurs). Capability must allow for assured, secure and trusted communications protected with Federal Information Processing Standard (FIPS) 140-2 compliant cryptography. Solutions must require minimal management/infrastructure overhead, be able to integrate into existing DoD and commercial information systems, and leverage government-owned/operated capabilities to the maximum extent possible. Capability must enhance government collaboration in its ability to predict, detect, analyze, assimilate, mitigate, and deter cyber threats.

## Project Selection Process

We go to great lengths to ensure only the most promising technologies are selected for funding. All projects selected must first provide a unique (non-duplicative), improved capability to the Warfighter and/or enhance efficiency/effectiveness of the defense deployment and distribution system. Projects are selected on their validity as an RDT&E or Joint Capability Technology Demonstration (JCTD)/Emerging Capabilities & Prototyping effort, return on investment, joint application and ability to be transitioned into or become a Program of Record. The USTRANSCOM RDT&E project selection process ensures these criteria are met by an intense internal command-wide screening process followed by a review and vetting by the joint community to include the Services, CCMDs, Joint Staff, Office of Secretary of Defense and Defense Logistics Agency before final project approval.

More information on the project selection process and the proposal format can be found by visiting the program web site at http://www.transcom.mil/cmd/associated/rdte/, then click on References, and then open USTRANSCOM RDT&E Program Instruction 61-1.

# Delivered Capabilities – Global Access

**Joint Modular Intermodal Distribution System**
- Developed a standardized container for use between conveyances
- 23% reduction in 20FT container requirement; 32% reduction in air pallets resulted in 50 fewer C-130 sorties/14 fewer C-17 sorties during operational user evaluation; $16M annual cost avoidance in uni-pack use
- Over 22,500 procured by Services to date

**Joint Recovery and Distribution System**
- Produced a common Joint Cargo Handling System (truck family)
- Initial 75 missions in Afghanistan recovered >$80M in vehicles and a $200M C-17

**Deployable Cargo Screener**
- Developed to screen cargo pallets for explosives
- Technology leveraged by the Army and incorporated into a robotics system to detect explosives

**CONTRAIL**
- Produced the Sain Beam rack to allow for more efficient stacking of oversized containers
- Produced the CONTRAIL Cargo Carrier to increase the efficiency by which military vehicles are transported on container ships

**Joint Enabled Theater Access-Seaport of Debarkation**
- Produced planning/decision support tool for analysis of austere ports locations for anti-access areas
- Produced lightweight modular causeway to support sea base to shore movement

**Large Vessel Interface-Lift-on/Lift-off**
- Multi-phase effort to provide capability to conduct inter-ship transfer of fully loaded containers at sea in up to Sea State 4
- Navy demonstrated (May 2010) capability to transfer ½ loaded 20FT container
- Demonstrated (Spring 2013) the telescopic crane retrieval of container from ships hold at sea

**Shipboard Selective Access and Retrieval System**
- Adapted commercial air skid technology to move cargo and vehicles in a Large, Medium-Speed Roll-on/Roll-Off cargo hold in conditions up to Sea State 5 (increased stowage; greater onboard flexibility to reshuffle loads)
- Transitioned into the Dense Packed Access & Retrieval Transit JCTD

*Joint Recovery and Distribution System*

# Delivered Capabilities – Global Access

*Precision Air Drop System*

**Mission Planner**
- Dramatically improved accuracy/operationalized capability (>400Mlbs delivered since Aug 06)
- Achieved an 80% reduction in recovery operations; reduced improvised explosive device exposure (convoys, personnel survivability)

**Low Cost Low Altitude**
- Reduced requirement for hazardous ground convoys; reduced airdrop retrograde recovery
- Increased cargo capacity by 1,500 pounds per pallet

**High Speed Container Delivery System**
- 70% reduced exposure to ground threat (enhancing aircraft & aircrew safety); improved delivery accuracy within 50 meters of drop zone target
- Currently supporting theater operations

**K-Max/Hummingbird**
- Determined sling load characteristics, produced prototype spawned Autonomous Technologies for Unmanned Air Systems (ATUAS) JCTD
- Initial flight Dec 2011; flown 2044.1 total flight hours & delivered more than 4.2Mlbs of mission/deployment cargo (Feb 2014)
- Takes 4 trips to deliver same load as CH-53E with 80% lower maintenance & 50% lower operating costs

**Autonomous Technologies for Unmanned Air Systems**
- Elements of ATUAS software currently in theater; transitioned to K-Max (enhancing on board mission management capabilities)
- Reduced need for truck convoys over hazardous/unimproved roads; enhanced ability to sustain troops in isolated/remote areas; added retrograde capability, precision landing & beyond line of sight control via autonomous beacon delivery system, dynamic re-planning & obstacle avoidance

**Guidance, Navigation & Control**: Further improved delivery accuracy and overall utility by incorporating terrain avoidance & guidance enhancements

**Helicopter Sling Load for Joint Precision Air Delivery System (JPADS)**: New capability that allows delivery of JPADS payloads from the cargo hook of a helicopter

**Wireless Gate Release System**
- Doubles C-130 delivery capacity (cost avoidance in lower fuel and aircraft wear/tear associated costs)
- Eliminates bundle damage due to bundle mid-air collisions

# Delivered Capabilities – C2/Cyber/Decision Support

**Cross Domain Collaborative Info Exchange**
- Deliver a suite of tools for the Joint Warfighter with text chat language translation, whiteboard, audio and guard functionality
- Enable cost-effective coalition and interagency information sharing for effective command and control

**Coalition Mobility System**
- Provides visibility and supports scheduling of coalition movements
- Annual $2.3M cost avoidance (flying hours saved by utilizing coalition assets and more efficient use of U.S. assets)

**Transportation Tracking Number**
- Created a FedEx-like commodity tracking number to increase end-to-end visibility of transportation requirements
- Significantly reduce re-ordering errors, reduce costs and enhance warfighter confidence

**Node Management and Deployable Depot**
- Deployed in support of Hurricane Ike – processed 4,000 truck loads of meals and ice
- Fielded Defense Logistics Agency's (DLA) Deployable Depot to manage in-theater logistics
- Reduced military inter-theater airlift for DLA managed items and cut Customer Wait Time by 45%

**Expeditionary Theater Distribution**
- Produced next-generation Portable Deployment Kit improving security, communications, expanding capabilities, and reducing overall weight by ~50%
- Lightens the soldier's burden

*Portable Deployment Kit*

**Semantic Enterprise Services - Auto Metatagging:** Capability provides geographic, contextual, and organizational routing metatags based on USTRANSCOM operational concepts and vocabulary, supporting automated information discovery

**Collaborative Operational Picture - Deployment & Distribution**
- Provided single sign on capability (i.e., ability to have one sign on to access multiple disparate distribution IT systems…saving man-hours and reducing confusion)
- Launched distribute.mil

**Single Mobility System (SMS) Enterprise Web Services**
- Retrieve application data without a unique developed interface, complex mechanisms for transmitting the data, or internal parsing routines for data translation or storage
- Transitioned into SMS

**Joint Transportation Asset Scheduling Kit**
- Automated scheduling of Joint Operational Support Airlift Center missions supporting United States Northern Command requirements
- Reduces schedule generation time – 50 requirements scheduled in ~10 minutes
- Produces complete schedule in 2 hours rather than 1+ days

# Delivered Capabilities – C2/Cyber/Decision Support

**En Route Trauma Patient Care Module**
- Army Surgeon General, National Air and Space Agency and USTRANSCOM collaboration to provide enhanced/continuous patient care & monitoring (from the battlefield to definitive care)
- More efficient use of liquid oxygen supply (saving DoD millions)

**Analysis Mobility Platform (AMP)-Joint Integrated Campaign Model (JICM)**
- Dynamically linked DoD's JICM with USTRANSCOM's AMP providing a joint/collaborative transportation & distribution modeling federation
- Transitioned into AMP

**End-to-End Distribution Modeling**
- Mode/port selection and scheduling prototype to facilitate force and sustainment movement optimization
- Mode selection scheduling algorithm – extends planning and analysis capability to execution world-wide
- Spirally transitioning new capabilities into AMP

**Total Transportation Feasibility Model**
- Provide full-spectrum transportation adaptive planning and analysis in a collaborative, web-accessible, service-oriented environment
- Transition into the Joint Flow & Analysis System for Transportation

**Distribution Performance Nodal Model**
- Developed a highly configurable model to express and analyze complex/detailed business processes within distribution nodes
- Enhanced ability to conduct programmatic distribution analysis
- Transitioned into AMP

**Auto Response to Unexpected Events**
- A domain-independent autonomous agent to reason about what goals to pursue in response to unexpected port events
- Transitioned into Integrated Computerized Deployment System

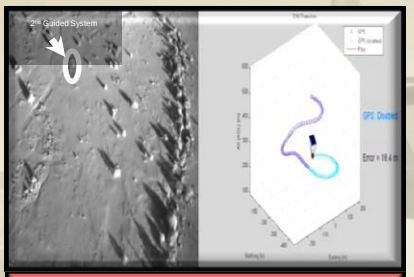
**Cognitive Visualization, Alerting & Optimization**
- Graphic User Interface approach was adapted to support Agile Transportation for the 21st Century (AT21)/related AMP development
- Rapid COA Analysis transitioned to AT21

**Single Load Planning Capability**
- Provided a collaborative info workspace where incoming cargo can be dragged and dropped into load plans for follow-on conveyance
- Transition into Intelligent Road Rail Information System

**Fusion Center Organizational Effectiveness**
- Leveraged Air Force Research Lab Human Effectiveness Directorate expertise to optimize USTRANSCOM Fusion Center organization
- Enhanced operational effectiveness

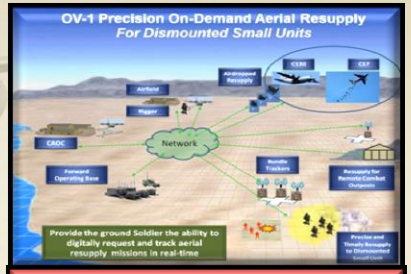
**Next Generation Autonomic Logistics**
- Monitor/report maintenance status of combat assets in tactical operations; distribution demand forecasting/execution monitoring tools
- Timely tactical logistics demand data "injected" into operational and strategic level distribution systems – 53% reduction in time required to process class IX requisitions
- Fueled expanded Army, United States Marine Corps, and USTRANSCOM Predictive Analysis initiative designed to provide more accurate (30/60/90 day) needs forecasts

# Current Initiatives – Global Access



**Enhanced Visualization for JPADS**

Guidance software enabling precision guidance of airdrop bundles in areas of denied GPS information




**Precision On-Demand Aerial Resupply**

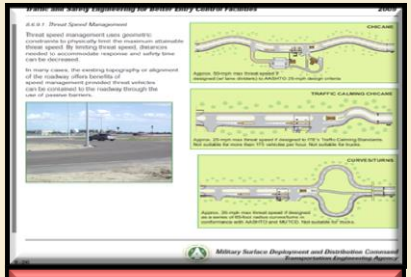
Demo to provide the Nett Warrior equipped Army Small Unit located in remote/austere locations

**Leap Ahead Precision Airdrop Tech**

Multiple guidance and airfoil technology initiatives to increase delivery accuracy

**LAIRCM Enhanced Situational Awareness**

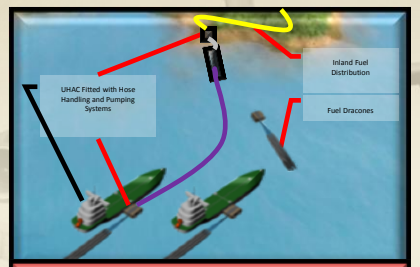
Drop zone situational awareness, bundle geo-location and single pass airdrop operations



**Traffic Engineering Research**

Reduce threat vehicle speeds through design changes at military Entry Control Facilities

# Current Initiatives – Global Access




**Expeditionary End-to-End Fueling Concept**

Prototype modular pumping system to reduce risk and inform development of the Army E2FDS program

**Joint Logistics Environmental Monitoring**

Real-time monitoring and display system of local wave/current/wind conditions


**Preamble Initial Look Leading to Accelerated Results**

Rapid repair capability to fix a damaged pier

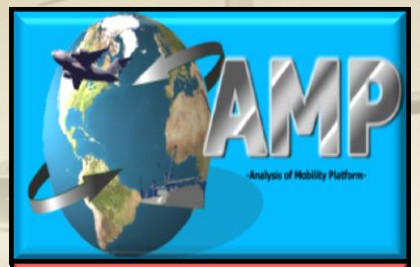
**Dense Pact Access Retrieval & Transit**

Selectively access vehicles, aircraft and containers and move them in confined spaces

**Rough Terrain Container Handler**

Standard container movement operations quicker, safer, and without need of a safety spotter

# Current Initiatives – C2/Cyber/Decision Support

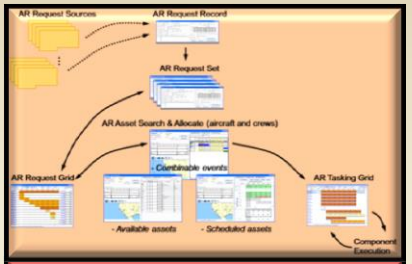



**End-to-End Distribution Modeling**

Generate a sub-model to streamline the time to simulate various portions of the scenario w/o executing entire model run

**Global Mission Scheduling**

Fine-tune pairing of air movement requirements and resources

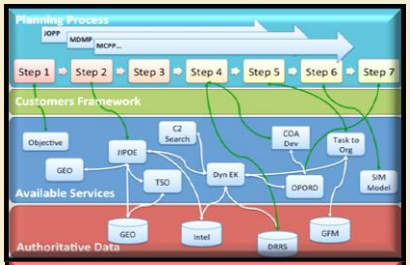



**Support Planning for Aerial Refueling**

Capture visibility of non-AMC refueling fleet and international partner assets

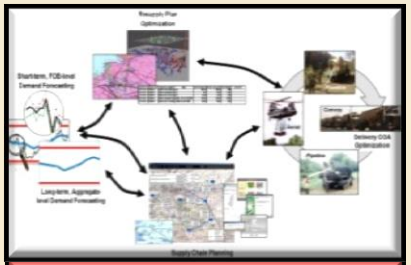

**Agile Transportation for 21st Century**

Improve theater rqmts and capacities visibility, enhance the CCMDs' visibility and participation in E2E planning, and assist the CCMDs in capturing and analyzing performance metrics




**Map Based Planning System**

Collaborative geospatially enabled capability for CCMD planners to rapidly develop multiple courses of action & conduct deliberate planning



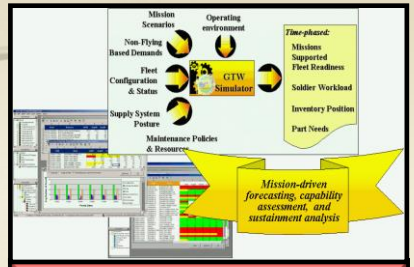
**Sustain Plan & Optimized Resupply in Theater**

Determine typical/peak demands and characterize daily, weekly and monthly usage patterns

# Current Initiatives – C2/Cyber/Decision Support

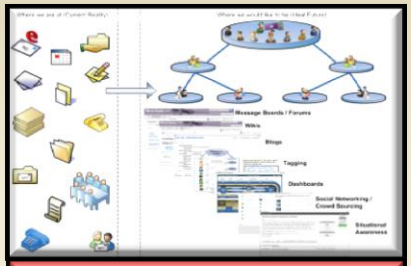
**Predictive Analysis for Maintenance and Log**

Forecasts of parts/supplies and maintenance requirements of tactical equipment



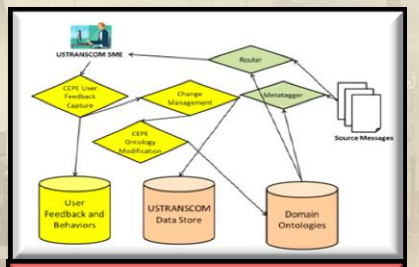

**Class IX Demand Forecasting**

Exposing previously hidden demand pattern dynamics/variability so they can be dealt with proactively



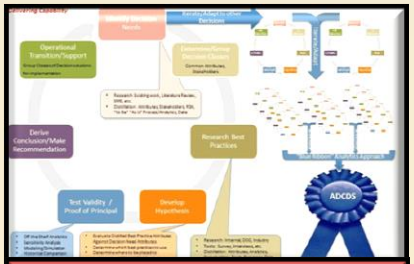
**Situational Awareness and Collaboration**

Web-based collaboration to improve organizational ability to harness/share information



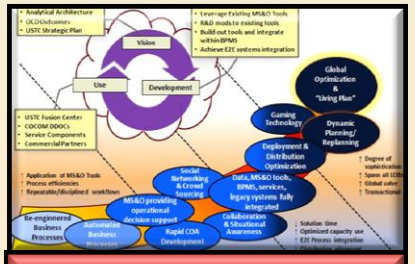

**Collaborative Event Processing Environment**

Browser-based tool to capture user feedback/expertise/learning preferences and domain knowledge




**Analytics Driven Command Decision**

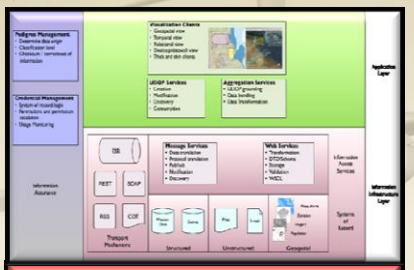
Enhance organizational decision making by providing a holistic methodology




**MIT Lincoln Lab**

Developing an operational architecture framework and roadmap for the Command

# Current Initiatives – C2/Cyber/Decision Support

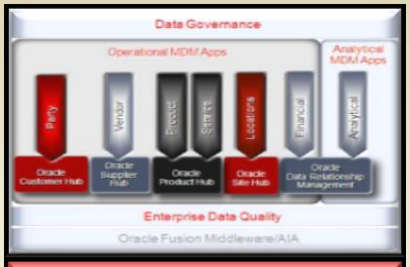


**Strategies for Enterprise Metadata**

Comprehensive account of strategies, optional implementations and recommendations for enterprise-wide management of metadata

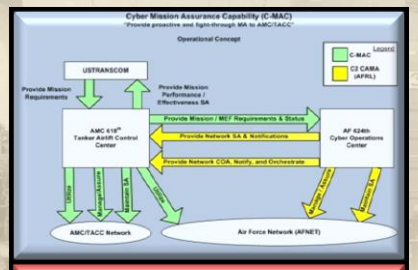
**Data Lakes**

A repository for structured and unstructured data that can “swim freely” & preserve data fidelity for use in real time analysis



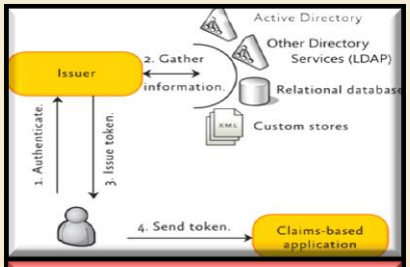

**Transformation to Enterprise-Wide Data**

Establish the way forward for a USTRANSCOM Master Data Management solution




**Cyber Mission Assurance Capability**

Recognize disruptive events and choose and implement responses that best balance addressing the cyber threat while minimizing mission impact




**Identity and Access Management**

Custom attribute solutions with extensive documentation for open standards based identity providers

**Modeling & Simulation Innovation**

Select student research/faculty-assisted projects

# USTRANSCOM TECHNOLOGY TRANSFER (T2)

**USTRANSCOM uses T2 mechanisms of the federal laboratories to facilitate voluntary collaboration by experts from government, industry, and academia, revealing costs and benefits of innovations to understand the feasibility of future capabilities.**

Concept of Operations for Unpiloted Cargo Air Vehicles

Concept of Operations and Lifecycle Costs for Hybrid Airships

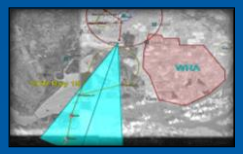
Prediction and Mitigation of the Effects of Wind Farms on Air Traffic Control Radars


Gaming Techniques for Training Command Center Decision-makers

## *Exploring Future Capabilities*

- Collaborate with experts
- Team with academia and industry
- Develop new concepts
- Explore innovations
- Understand tech readiness levels
- Apply and mature new techniques
- Build Public-Private Partnerships
- Create Concepts of Operation
- Scope costs/benefits/ROI
- Develop/share intellectual property
- Patent, trademark, copyright
- License/commercialize technologies

Performance Assessment of Portable Gapfiller Radars in Wind Farm Regions



Multi-Mission Logistics Vessel Concept

Employment of War Risk Insurance

Identify Safety Trends and Indicators in AMC Flight Data

FEDERAL LABORATORY CONSORTIUM FLC FOR TECHNOLOGY TRANSFER



Warfighter Sleep Kit®

Science Technology Engineering and Mathematics

NDEP NATIONAL DEFENSE EDUCATION PROGRAM BUILDING AMERICAN STRENGTH IN SCIENCE AND ENGINEERING

SOUTHERN ILLINOIS UNIVERSITY EDWARDSVILLE

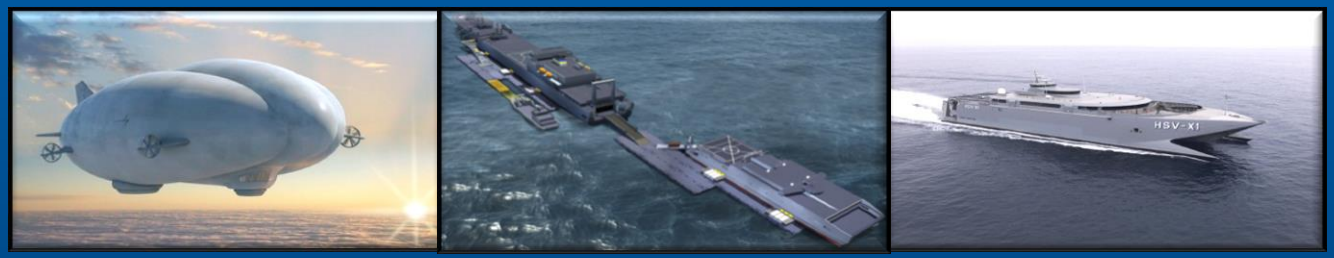
- Container and Yard Management
- Cloud Computing Security

# FAR-TERM TECHNOLOGY FOCUS

## Future Deployment and Distribution Assessment (FDDA)

The USTRANSCOM Joint Distribution Process Analysis Center's FDDA is a perennial effort intended to assess and catalog needed deployment and distribution capabilities and solutions of interest in the extended planning period and beyond

- Assess/catalogue needed deployment and distribution capabilities/solutions
- Synthesize and vet future JDDE capability gaps
- Identify S&T initiatives that may fill gaps or improve deployment and distribution capabilities – beyond the Program Objective Memorandum
- Provide a forum and a process to shape S&T efforts and enhance JDDE capabilities



# Handbook Back Cover

## HOW TO CONTACT US

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Also take a moment to check out our web site.

http://www.transcom.mil/cmd/associated/rdte/